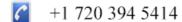# Avantika Mathur, Ph.D.

## Post-Doctoral Research Fellow

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## EDUCATION

| | |
|---|---|
| 2011- 2 017 | **Ph.D., Cognitive Neuroscience,** National Brain Research Centre (NBRC), India<br>Dissertation: "Characterizing the emotions experienced by North Indian classical *ragas* – Behavior and Neuroimaging study."<br><br>Advisor: Dr Nandini C. Singh |
| 2009-2011 | **M.Sc. Neuroscience**, (64.56%), National Brain Research Centre, India<br>Dissertation: "Investigating the behavioral and neural processing of transliteration, wherein a non-native script Roman (English) is used to represent other languages thus giving rise to Romanized transliteration, for instance, Romanagari – Romanized Hindi."<br><br>Advisor: Dr Chaitra Rao, Dr Nandini C. Singh, |
| 2006-2009 | **B.Sc. Biological Science** (Honors) (75.72%)<br>Sri Venkateswara College, Delhi University, New Delhi, India |
| 2004-2006 | Higher Secondary Certificate, HSC (Class XII), Birla Vidya Niketan, New Delhi, India (85 %) |
| 1994-2004 | Secondary School Certificate, SSC (Class X), Bal Bharati Public School, Noida, India (94%) |

## PROFESSIONAL EXPERIENCE

**Post-doc Research Fellow**          University of Nebraska-Lincoln, NE          2018/03 – present

Mentor: Dr Yingying Wang
Project: "Identifying Neural and Behavioural Characteristics of Reading in Children with Hearing Loss."

- Built cognitive tasks to assess phonological processing during reading in children with typical hearing and in children with hearing loss.
- Developing data processing pipelines in MATLAB to analyze functional magnetic resonance imaging (fMRI) and diffusion weighted imaging (DWI) data to assess the reading brain network in children with typical hearing and in children with hearing loss.

**Ph.D. Cognitive Neuroscience**          National Brain Research Centre, India          08/2011-04/2017

Mentor: Dr Nandini C. Singh
Project: "Characterizing the emotions experienced by North Indian classical *ragas* – Behaviour and Neuroimaging study."

- Designing online surveys. Conducted an online research study to sample and analyze the emotions experienced while listening to *ragas* of Hindustani classical music by a culturally diverse population on a large-scale.
- Experience in statistical analysis and interpretation of large-scale behavioral data.
- Assessed musical features of audio files using home-based MATLAB codes.
- Designed functional magnetic resonance imaging experiments to identify neural correlates of emotion experienced during music listening.
- Developed data processing pipelines in MATLAB to analyze functional (fMRI) data and performed connectivity analysis to identify emotion network of the brain activated during music listening.
- Trained undergraduates, graduate students, and technicians in fMRI data analysis and setting up of behavioral and fMRI experiments.

## TECHNICAL EXPERIENCE

- Constructing behavioural paradigms using E-prime.
- Programming languages: MATLAB.
- Statistical data analysis using SPSS.
- Acoustic analysis using different platforms - MIR toolbox, Sonic Visualizer and MATLAB (pitch analysis of music stimulus using home-based MATLAB codes).
- Functional fMRI data analysis using:
  - SPM software - familiar with the first level, second level analysis, Marsbar toolbox, Anatomy toolbox, AAL toolbox, MRI Cro.
  - Brain Voyager – Preprocessing, statistical analysis with GLM, Creating VOI's.
- Brain Connectivity analysis – PPI (Psychophysiological interaction) using MATLAB based gPPI toolbox.
- Familiar with basics of multivariate pattern analysis (MVPA).
- DTI analysis using FSL.
- Psychophysiological data collection – BIOPAC, Data analysis – Acknowledge software

## STUDENT MENTORING

### Undergraduate research Assistant

- Cristal Franco-Granados, Department of Biological Sciences, University of Nebraska Lincoln Project: Identifying Neural and Behavioral Characteristics of Reading in Children with Hearing Loss 2018 Summer
- Michelle Rohman, Department of Biological Sciences, University of Nebraska Lincoln Project: Identifying Neural and Behavioral Characteristics of Reading in Children with Hearing Loss, 2018 Summer

## EXTRACURRICULAR UNIVERSITY SERVICES

- Evaluator for Undergraduate Creative Arts and Research Experience (UCARE) applications for the Academic Year 2018-19 funding period.
- Judged graduate and undergraduate posters at the UNL Spring Research Fair 2018.

## CONFERENCES (*Poster presentations and Invited talks*)

- Neuromusic 2017, 15-18 June 2017, Harvard Medical School, Boston, USA
  \***Poster Presentation**
- 3rd Annual Conference on Cognitive Science (ACCS 2016), 3-5 October 2016, Indian Institute of Technology, IIT Gandhinagar, India
  \*Awarded Certificate of Excellence for **Oral Presentation**.
- 14th International Conference on Music Perception and Cognition (ICMPC), 5-9 July 2016, Hyatt Regency, San Francisco, California, USA
  \***Invited talk** and **poster presentation**
- International conference on Emotion and Cognition (ICEC - 2015), 14-16 December, 2015, Centre of Behavioral and Cognitive Sciences, Allahabad (India).
  \*Awarded Certificate of Excellence for **Oral Presentation**.
- 1st Annual Conference on Cognitive Science (ACCS 2014), 3-5 March 2014, International Centre, Max Mueller Marg, Lodhi Estate, New Delhi, (India).
  \*Awarded Certificate of Excellence for **Oral Presentation**.
- International Conference on Acoustics (Acoustics 2013 New Delhi), 10-15 November 2013, CSIR-NPL, New Delhi, (India)
- Frontier of Research in Speech and Music (FRSM 2013), 5-7 March 2013, TEQIP Hall (first floor), Jadavpur University, Kolkata (India)
- Frontier of Research in Speech and Music (FRSM 2012), 18-19 January 2012, KIIT College of Engineering, Gurgaon (India)

## STUDENT EXCHANGE VISITS

Exchange student at Jens Schwarzbach's lab, Center for Mind/Brain Sciences (CIMEC) Italy, for a period of 3 months (**May - July 2014**) under the India - Trento Programme for Advanced Research (ITPAR). Exchange Experience:

- Learnt Brain Voyager as a platform to analyse fMRI data, and
- Basics of CoSMo MVPA toolbox to conduct multivariate pattern analysis (MVPA).

## FELLOWSHIPS AND TRAVEL GRANTS

- DBT and DST travel grant for Neuromusic 2017, 15-18 June 2017, Harvard Medical School, Boston, USA
- National Brain Research Centre Travel Grant 2016 for 14<sup>th</sup> International Conference on Music Perception and Cognition (ICMPC) 2016, 5-9 July 2016, Hyatt Regency, San Francisco, California, USA
- SEMPRE Travel Award for 14<sup>th</sup> International Conference on Music Perception and Cognition (ICMPC) 2016, 5-9 July 2016, Hyatt Regency, San Francisco, California, USA
- India Trento Programme for Advanced Research (ITPAR) grant scholarship [10/5/2014 – 02/08/2014]
- Senior Research Fellowship (SRF), National Brain Research Centre          [2013- 2017]
- Junior Research Fellowship (JRF), National Brain Research Centre          [2011- 2013]
- Masters Fellowship, NBRC, India          [2009-2011]

## PUBLICATIONS

### Peer-Reviewed Journal Articles

1. Rao, C., Mathur, A., & Singh, N. C. (2013). "Cost in transliteration": the neurocognitive processing of Romanized writing. *Brain and Language*, *124*(3), 205–12. http://dx.doi.org/10.1016/j.bandl.2012.12.004
2. Mathur, A., Vijayakumar, S. H., Chakrabarti, B., & Singh, N. C. (2015). Emotional responses to Hindustani *raga* music: the role of musical structure. *Frontiers in Psychology*, *6*(April), 1–11. http://doi.org/10.3389/fpsyg.2015.00513
3. Valla, J., Mathur, A., Alappatt, J. A., & Singh, N. C. (2017). Music and Emotion–a case for North Indian Classical Music. *Frontiers in Psychology*, *8*, 2115. https://doi.org/10.3389/fpsyg.2017.02115

### Manuscripts (In Preparation or under review)
1. Mathur, A., Midya, V., & Singh, N. C. A cross cultural comparison of emotions experienced in *raga* music: the role of rhythmic regularity and tonality. (***Under review***)
2. Mathur, A., Singh, N. C. The '*rasa*' in the '*raga*'? Brain networks of emotional responses to North Indian classical *ragas*. (***Submitted***)
[Published as a part of conference proceedings in 14<sup>th</sup> International conference on music perception and cognition (ICMPC 2016)]